**What is claimed is:**

1. An optical transmission device, comprising:

an optical tunable filter which transmits and extracts signal light with a specific wavelength from signal light multiplexed by a wavelength-division multiplexing (WDM) method and whose wavelength transmission characteristic varies depending on a control signal;

a light transmission filter to which signal light extracted by the optical tunable filter is inputted and which has a wavelength transmission characteristic curve that has its peak in a wavelength located between a first continuous set band and a second continuous set band longer in wavelength than the first set band, and that linearly drops from the peak toward a shorter wavelength side than the first set band and also toward a longer wavelength side than the second set band; and

a control signal generating unit generating a control signal needed to enable the optical tunable filter to extract the signal light with a desired wavelength, based on the light transmitted through the light transmission filter.

2. The optical transmission device according to claim

1, wherein

the first set band is a wavelength band between 1,525nm and 1,565nm;

the second set band is a wavelength band between 1,570nm and 1,610nm; and

the peak of the wavelength transmission characteristic curve exists between 1,565nmm and 1,570nm.

3. The optical transmission device according to claim 1, wherein

said light transmission filter further has a wavelength transmission characteristic of blocking signals out of a wavelength band in which the multiplexed signal light is inputted to said optical tunable filter.

4. The optical transmission device according to claim 1, further comprising:

a first optical strength detecting unit detecting the optical strength of light transmitted through said light transmission filter; and

a storage unit storing information indicating the wavelength transmission characteristic of said light transmission filter,

wherein

said control signal generating unit generates the control signal, based on both optical strength detected by said first optical strength detecting unit when shifting the wavelength transmission characteristic of said optical tunable filter across the entire wavelength band including all segments of the multiplexed signal light and information stored in the storage unit.

5. The optical transmission device according to claim 4, further comprising

a second optical strength detecting unit detecting strength of light transmitted through said optical tunable filter,

wherein

said control signal generating unit generates the control signal, based on both respective optical strength detected by said first and second optical strength detecting units when shifting the wavelength transmission characteristic of said optical tunable filter across the entire wavelength band including all segments of the multiplexed signal light and information stored in the storage unit.

6. An optical transmission device, comprising:

an optical tunable filter, whose wavelength

transmission characteristic varies depending on a control signal, transmitting and extracting signal light with a specific wavelength from signal light multiplexed by a wavelength-division multiplexing (WDM) method;

a light transmission filter to which signal light extracted by the optical tunable filter is inputted and which has a wavelength transmission characteristic curve that has its bottom in a wavelength located between a first continuous set band and a second continuous set band longer in wavelength than the first set band, and that linearly rises from the bottom toward a shorter wavelength side than the first set band and also toward a longer wavelength side than the second set band; and

a control signal generating unit generating a control signal needed to enable the optical tunable filter to extract the signal light with a desired wavelength, based on light transmitted through the light transmission filter.

7. The optical transmission device according to claim 1, further comprising:

a first optical strength detecting unit detecting strength of light transmitted through said light transmission filter; and

a third optical strength detecting unit detecting the strength of reflected light which is extracted from said light transmission filter when signal light is inputted to said light transmission filter and which has a reflection characteristic, being the reversal of the wavelength transmission characteristic provided to light transmitted through said light transmission filter,

wherein

said control signal generating unit generates the control signal, based on respective strength detected by the first and third optical strength detecting units.

8. The optical transmission device according to claim 7, further comprising

a storage unit storing respective information indicating a characteristic of a difference for each wavelength between the wavelength transmission characteristic and the reflection characteristic of said light transmission filter,

wherein

said control signal generating unit generates the control signal, based on both a difference in strength between respective optical strength detected by said first and third optical strength detecting units, and

information stored in the storage unit.

9. An optical transmission device, comprising:

an optical tunable filter which transmits and extracts signal light with a specific wavelength from signal light multiplexed by a wavelength-division multiplexing (WDM) method and whose wavelength transmission characteristic varies depending on a control signal,

a light transmission filter to which signal light extracted by the optical tunable filter is inputted and which has a wavelength transmission characteristic curve that has its respective peaks of a center wavelength in a first continuous set band and of a center wavelength in a second continuous set band longer in wavelength than the first set band and that linearly drops from each peak toward a wavelength located between the first and second set bands, also from the peak of the center wavelength in the first set band toward the shorter wavelength side than the first set band, and also from the peak of the center wavelength in the second set band toward the longer wavelength side than the second set band; and

a control signal generating unit generating a control signal needed to enable the optical tunable

filter to extract signal light with a desired wavelength, based on the light transmitted through the light transmission filter.

10. The optical transmission device according to claim 9, further comprising

a first optical strength detecting unit detecting the optical strength of light transmitted through said light transmission filter; and

a storage unit storing information indicating the wavelength transmission characteristic of said light transmission filter,

wherein

said control signal generating unit generates the control signal, based on both optical strength detected by said first optical strength detecting unit when shifting the wavelength transmission characteristic of said optical tunable filter across the entire wavelength band including all segments of the multiplexed signal light and information stored in the storage unit.

11. The optical transmission device according to claim 10, further comprising

a second optical strength detecting unit detecting strength of light transmitted through said optical

tunable filter,

wherein

said control signal generating unit generates the control signal, based on both respective optical strength detected by said first and second optical strength detecting units when shifting the wavelength transmission characteristic of said optical tunable filter across the entire wavelength band including all segments of the multiplexed signal light and information stored in the storage unit.

12. An optical transmission device, comprising:

an optical tunable filter which transmits and extracts signal light with a specific wavelength from signal light multiplexed by a wavelength-division multiplexing (WDM) method and whose wavelength transmission characteristic varies depending on a control signal;

a light transmission filter to which signal light extracted by the optical tunable filter is inputted and which has a wavelength transmission characteristic curve that has its respective bottoms of a center wavelength in a first continuous set band and of a center wavelength in a second continuous set band longer in wavelength than the first set band and that linearly

rises from each bottom toward a wavelength located between the first and second set bands, also from the bottom of the center wavelength in the first set band toward the shorter wavelength side than the first set band, and also from the bottom of the center wavelength in the second set band toward the longer wavelength side than the second set band; and

a control signal generating unit generating a control signal needed to enable the optical tunable filter to extract signal light with a desired wavelength, based on the light transmitted through the light transmission filter.

13. The optical transmission device according to claim 12, further comprising:

a first optical strength detecting unit detecting the optical strength of light transmitted through said light transmission filter; and

a storage unit storing information indicating the wavelength transmission characteristic of said light transmission filter,

wherein

said control signal generating unit generates the control signal, based on both optical strength detected by said first optical strength detecting unit when

shifting the wavelength transmission characteristic of said optical tunable filter across the entire wavelength band including all segments of the multiplexed signal light and information stored in the storage unit.

14. The optical transmission device according to claim 13, further comprising

a second optical strength detecting unit detecting strength of light transmitted through said optical tunable filter,

wherein

said control signal generating unit generates the control signal, based on both respective optical strength detected by said first and second optical strength detecting units when shifting the wavelength transmission characteristic of said optical tunable filter across the entire wavelength band including all segments of the multiplexed signal light and information stored in the storage unit.

15. The optical transmission device according to claim 1, wherein

said light transmission filter further has a wavelength transmission characteristic curve that has its bottom in a wavelength located between the first set

band and a third continuous set band shorter in wavelength than the first set band and that linearly rises from the bottom toward the peak in a wavelength located between the first and second set bands and also toward the shorter wavelength side than the third set band.

16. The optical transmission device according to claim 15, wherein

the first set band is a wavelength band between 1,525nm and 1,565nm;

the second set band is a wavelength band between 1,570nm and 1,610nm; and

the third set band is a wavelength band between 1,480nm and 1, 520nm, wherein

the peak of the wavelength transmission characteristic curve in a wavelength located between the first and second set bands exists between 1,565nm and 1,570; and

the bottom of the wavelength transmission characteristic curve in a wavelength located between the first and third set bands exists between 1,520nm and 1,525nm.

17. The optical transmission device according to claim

15, further comprising

a first optical strength detecting unit detecting the optical strength of light transmitted through said light transmission filter; and

a storage unit storing information indicating the wavelength transmission characteristic of said light transmission filter,

wherein

said control signal generating unit generates the control signal, based on both optical strength detected by said first optical strength detecting unit when shifting the wavelength transmission characteristic of said optical tunable filter across the entire wavelength band including all segments of the multiplexed signal light and information stored in the storage unit.

18. The optical transmission device according to claim 17, further comprising

a second optical strength detecting unit detecting strength of light transmitted through said optical tunable filter,

wherein

said control signal generating unit generates the control signal, based on both respective optical strength detected by said first and second optical

strength detecting units when shifting the wavelength transmission characteristic of said optical tunable filter across the entire wavelength band including all segments of the multiplexed signal light and information stored in the storage unit.

19. The optical transmission device according to claim 6, wherein

said light transmission filter further has a wavelength transmission characteristic curve that has its peak in a wavelength located between the first set band and a third continuous set band shorter in wavelength than the first set band and that linearly drops from the peak toward the bottom in a wavelength located between the first and second set bands and also toward the shorter wavelength side than the third set band.

20. The optical transmission device according to claim 19, further comprising:

a first optical strength detecting unit detecting the optical strength of light transmitted through said light transmission filter; and

a storage unit storing information indicating the wavelength transmission characteristic of said light

transmission filter,

wherein

said control signal generating unit generates the control signal, based on both optical strength detected by said first optical strength detecting unit when shifting the wavelength transmission characteristic of said optical tunable filter across the entire wavelength band including all segments of the multiplexed signal light and information stored in the storage unit.

21. The optical transmission device according to claim 20, further comprising

a second optical strength detecting unit detecting strength of light transmitted through said optical tunable filter,

wherein

said control signal generating unit generates the control signal, based on both respective optical strength detected by said first and second optical strength detecting units when shifting the wavelength transmission characteristic of said optical tunable filter across the entire wavelength band including all segments of the multiplexed signal light and information stored in the storage unit.

22. An optical transmission device, comprising:

an optical tunable filter which transmits and extracts signal light with a specific wavelength from signal light multiplexed by a wavelength-division multiplexing (WDM) method and whose wavelength transmission characteristic varies depending on a control signal;

a light transmission filter to which signal light extracted by the optical tunable filter and whose wavelength transmission characteristic curve monotonously changes in a range between a first continuous set band and a second continuous set band longer in wavelength than the first set band; and

a control signal generating unit generating a control signal needed to enable the optical tunable filter to extract signal light with a desired wavelength, based on light transmitted through the light transmission filter.

23. The optical transmission device according to claim 22, wherein

the monotonous change of the wavelength transmission characteristic curve of said light transmission filter covers at least 60nm or more.

24. An optical transmission device, comprising:

an optical tunable filter which transmits and extracts signal light with a specific wavelength from signal light multiplexed by a wavelength-division multiplexing (WDM) method, using a first continuous set band, a second continuous set band longer in wavelength than the first set band, and a third continuous set band shorter in wavelength than the first set band, and whose wavelength transmission characteristic curve varies depending on a control signal;

a detection unit detecting signal light extracted by the optical tunable filter;

a reference signal light detecting unit detecting two segments of reference signal light from the signal light extracted by the optical tunable filter, which are always contained in signal light inputted to the optical tunable filter, and one of which is a known to be located between the first and second set bands and the other of which is known to be located between the first and third set bands; and

a control signal generating unit generating the control signal, based on both a detection result of reference signal light which is known to be located between the first and second set bands, of all the detection results detected by the reference signal light

detecting unit and a detection result of the signal light detected by the detection unit if a wavelength of signal light extracted by the optical tunable filter is included in the second set band, and generating the control signal, based on both a detection result of reference signal light which is known to be located between the first and third set bands, of all detection results detected by the reference signal light detecting unit and a detection result of signal light detected by the detection unit if a wavelength of signal light extracted by the optical tunable filter is included in the third set band.

25. The optical transmission device according to claim 24, wherein

if an instruction to extract signal light is not received yet, said control signal generating unit performs in advance a process required to select one segment of reference signal light and to generate a control signal needed to extract the signal light, and upon receipt of the instruction, said control signal generating unit generate the control signal needed to extract instructed signal light, based on results performed up to then.

26. A control method of an optical tunable filter,

comprising:

detecting light transmitted through a light transmission filter to which signal light, extracted by the optical tunable filter which transmits and extracts signal light with a specific wavelength from signal light multiplexed by a wavelength-division multiplexing (WDM) method and whose wavelength transmission characteristic curve varies depending on a control signal, is inputted and which has a wavelength transmission characteristic curve that has its peak in a wavelength located between a first continuous set band and a second continuous set band longer in wavelength than the first set band and that linearly drops from the peak toward a shorter wavelength side than the first set band and also toward a longer wavelength side than the second set band; and

generating the control signal needed to enable the optical tunable filter to extract signal light with a predetermined wavelength, based on the detected result.

27. A control method of an optical tunable filter, comprising:

detecting light transmitted through a light transmission filter to which signal light, extracted by the optical tunable filter which transmits and extracts signal light with a specific wavelength from signal light

multiplexed by a wavelength-division multiplexing (WDM) method and whose wavelength transmission characteristic curve varies depending on a control signal, is inputted and which has a wavelength transmission characteristic curve that has its bottom in a wavelength located between a first continuous set band and a second continuous set band longer in wavelength than the first set band and that linearly rises from the bottom toward a shorter wavelength side than the first set band and also toward a longer wavelength side than the second set band; and

generating the control signal needed to enable the optical tunable filter to extract signal light with a predetermined wavelength, based on the detected result.

28. A control method of an optical tunable filter, comprising:

detecting light transmitted through a light transmission filter to which signal light, extracted by the optical tunable filter which transmits and extracts signal light with a specific wavelength from signal light multiplexed by a wavelength-division multiplexing (WDM) method and whose wavelength transmission characteristic curve varies depending on a control signal, is inputted and which has a wavelength transmission characteristic curve that has its respective peaks of a center

wavelength in a first continuous set band and of a center wavelength in a second continuous set band longer in wavelength than the first set band and that linearly drops from each peak toward a wavelength located between the first and second set bands, also from the peak of the center wavelength in the first set band toward a shorter wavelength side than the first set band, and also from the peak of the center wavelength in the second set band toward a longer wavelength side than the second set band; and

generating the control signal needed to enable the optical tunable filter to extract signal light with a predetermined wavelength, based on the detected result.

29. A control method of an optical tunable filter, comprising:

detecting light transmitted through a light transmission filter to which signal light, extracted by the optical tunable filter which transmits and extracts signal light with a specific wavelength from signal light multiplexed by a wavelength-division multiplexing (WDM) method and whose wavelength transmission characteristic curve varies depending on a control signal, is inputted and which has a wavelength transmission characteristic curve that has its respective bottoms of a center

wavelength in a first continuous set band and of a center wavelength in a second continuous set band longer in wavelength than the first set band and that linearly rises from each bottom toward a wavelength located between the first and second set bands, also from the bottom of the center wavelength in the first set band toward a shorter wavelength side than the first set band, and also from the bottom of the center wavelength in the second set band toward a longer wavelength side than the second set band; and

generating the control signal needed to enable the optical tunable filter to extract signal light with a predetermined wavelength, based on the detected result.

30. A control method of an optical tunable filter, comprising:

detecting light transmitted through a light transmission filter to which signal light, extracted by the optical tunable filter which transmits and extracts signal light with a specific wavelength from signal light multiplexed by a wavelength-division multiplexing (WDM) method and whose wavelength transmission characteristic curve varies depending on a control signal, is inputted and which has a wavelength transmission characteristic that monotonously changes in a range between a first

continuous set band and a second continuous set band longer in wavelength than the first set band; and

generating the control signal needed to enable the optical tunable filter to extract signal light with a predetermined wavelength, based on the detected result.

31. A control method of an optical tunable filter, comprising:

detecting signal light extracted by the optical tunable filter which transmits and extracts signal light with a specific wavelength from signal light multiplexed by a wavelength-division multiplexing (WDM) method, using a first continuous set band, a second continuous set band longer in wavelength than the first set band, and a third continuous set band shorter in wavelength than the first set band, and whose wavelength transmission characteristic curve varies depending on a control signal;

detecting two segments of reference signal light from the signal light extracted by the optical tunable filter, which are always contained in signal light inputted to the optical tunable filter, and one of which is known to be located between the first and second set bands and the other of which is known to be located between the first and third set bands; and

generating the control signal, based on both a detection result of reference signal light which is known to be located between the first and second set bands, of all the detection results of the reference signal light and a detection result of signal light if a wavelength of signal light extracted by the optical tunable filter is included in the second set band, and generating the control signal, based on both a detection result of reference signal light which is known to be located between the first and third set bands, of all detection results of the reference signal light and a detection result of signal light if a wavelength of signal light extracted by the optical tunable filter is included in the third set band.